

IN THE CLAIMS:

1. An alpha-amylase for processing grain, the alpha-amylase derived from  
*Bacillus acidocaldarius*, having low pH performance and producing a  
starch liquefact from grain, the liquefact free of maltulose and suitable for  
conventional saccharification processes without chemical additions or pH  
adjustment.
2. An alpha-amylase derived from *Bacillus acidocaldarius* for liquefying  
starch, the alpha-amylase following a single low temperature liquefaction  
process producing a starch liquefact free of maltulose, having a pH of  
about 4.0-4.5, a DE of about 10-12 and having inactivated alpha-amylase  
that does not adversely affect saccharification enzymes.
3. A process for producing glucose from starch comprising the acts of:
  - a) providing a mixture of a starch slurry having a pH as low as  
3.0 and an thermostable, acid-stable alpha-amylase capable of  
hydrolyzing starch at a pH as low as 3.0, the alpha-amylase  
cultured from *Bacillus acidocaldarius*;
  - b) liquefying the starch slurry by heating the mixture until a DE  
of about 10-12 is reached without the production of  
maltulose; and
  - c) adding a saccharification enzyme to the liquefied starch  
slurry from step b) and maintaining a resulting  
saccharification mixture at about 60° C for between about 10-  
48 hours or until about a 95% glucose yield is achieved.
4. The process of claim 3 wherein act a) is carried out without adjusting the  
pH of the starch slurry.
5. The process of claim 3 wherein act a) is carried out without adding a  
calcium salt.
6. The process of claim 3 wherein act a) is carried out without adjusting the  
pH of the starch slurry and without adding a calcium salt.
7. The process of claim 4 wherein act b) further comprises heating the  
mixture at about 105-110° C for 5-8 minutes.

8. The process of claim 7 wherein act c) is carried out without inactivating the alpha-amylase and without adjusting the pH of the liquefied starch slurry.
9. The process of claim 8 wherein act c) further comprises adding  
5 glucoamylase to the liquefied starch slurry.
10. The process of claim 8 wherein act c) further comprises adding a mixture of glucoamylase and pullulanase to the liquefied starch slurry.
11. A product produced by the process of claim 8.

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